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VIOLENT AND ACCIDENTAL MORTALITY AMONG IMMIGRANTS IN CANADA

by

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ABSTRACT

For most people immigration to a new country constitutes a positive move and an improvement in life. The many challenges associated with resettlement may, however, lead to insurmountable stresses and conflicts for a significant number of individuals. The mortality experience of immigrants may reflect the extent to which foreigners share problems of adaptation and adjustment to a new society. This situation is most directly reflected in causes of death that are known to have a significant stress and conflict component to them, namely suicide, homicide, and accidents. In this study a number of hypotheses concerning immigrant mortality are developed and tested using Poisson regression techniques. The results provide support for the importance of country of origin effects on immigrant suicide, but not on homicide and motor vehicle accidents. Income discrepancies are also a significant source of differences in the risk of dying from suicide, homicide and motor vehicle accidents. The strongest net effects on the cause-specific mortality rate was found to be associated with immigrant group membership. We hypothesize that this result reflects differences in the importance of the immigrant ethnic community as a source of social integration in addition to the effects of return migration selectivity.

1. Introduction

For many individuals migration entails a positive change in life, and a gain in opportunities and well-being. However, adjustment to a new society may pose innumerable difficulties. This study concerns itself with an analysis of immigrant mortality due to four causes of death that are largely associated with stresses and conflict in life: suicide, homicide, motor vehicle accidents and all other accidents and violence among four major immigrant groups in Canada during the period 1970-72.[1]

Much of the literature on immigrant mortality lies outside sociology even though it is a topic that bears directly on key sociological questions concerning immigrant adaptation and assimilation.[2] Clearly, immigrant behaviour, and hence violent and accidental mortality, is partly determined by background culture and the conditions migrants face in their new land. In this study we provide explicit tests for these potential sources of variation in migrant death rates.

The probability of mortality for migrants may be conditioned by a number of factors that intervene between the experience of personal troubles and the possible incidence of violent or accidental death. Durkheim (1951) advanced the proposition that persons who are socially integrated benefit from a lower risk of suicide. We assume this is also true in the case of homicide and accidental

death.[3] Immigrants share an important source of social integration that may condition the relationship between life stresses and conflict and exposure to the risk of death from suicide, homicide or accidents: differences in degree of ethnic community cohesiveness may explain discrepancies in violent and accidental mortality across immigrant groups because the community provides an important integrative function for newcomers in a foreign land (Breton, 1964; Trovato and Jarvis, 1986; MacDonald and MacDonald, 1964; Yancey et al., 1976).

Variability in migrant death rates may also be traced to culture of origin. For example, in the case of suicide, analysts have opined that some societies share a system of values and norms that predispose their members to increased odds of self-inflicted death (Hendin, 1964; Kushner, 1984). Moreover, there exists a substantial body of literature supporting the proposition that homicidal tendencies are linked to culture (Wolfgang and Ferracuti, 1967; Gastil, 1971; Hachney, 1969; Loftin and Hill 1974; Messner, 1983; 1989; Williams and Flewelling, 1989; Fiala and LaFree, 1988; Gartner, 1990).

2. Review of the Literature

Prior to the second World War, most foreign-born groups in the United States possessed higher overall mortality rates than the American-born population, especially in the case of external causes of death such as suicide, homicide

and accidents (Dublin and Baker, 1920; Dublin, 1963; Dublin et. al., 1936; Jacobson, 1963). In recent decades this situation seems to have reversed, with foreigners generally showing lower rates of mortality (Kestenbaum, 1986). The reasons for this reversal have not been explored in any systematic way, but Kestenbaum (1986) speculates that recent immigrants' improved socioeconomic status is responsible for this change. The study of Kitagawa and Hauser (1973) demonstrates that by the early 1960s, there was virtually no difference between the mortality rates of the foreign-born and the American-born. Jacobson (1963) showed that by 1960 there was a convergence in overall mortality; and in the case of deaths due to accidents and violence, foreigners had only a very slight disadvantage.

Most immigrant groups in Australia tend to enjoy lower overall death rates than both their countries of origin and destination (Young, 1987). Concerning suicide, the evidence indicates that migrant rates tend to surpass both those of Australia and their respective countries of origin, but they are more akin to those of their home countries than to their receiving society (Sainsbury and Barraclough, 1968; Burwill et al., 1973; 1982). Such evidence has been interpreted to mean that immigrant death rates are largely determined by cultural factors associated with their country of origin. National religion and group differences in values of familism and traditionalism

brought from the home land, may serve to either increase or reduce anomie in the new country (Burwill et al., 1973).

The influence of background culture on mortality risk may be an inverse function of duration of residence in the host society. In accordance with assimilation theory, one would expect that the longer immigrants reside in their host nation, the greater the erosion of their background culture and hence a convergence in mortality rates with those of the host society. This hypothesis was not supported by Burwill and associates (1982). They established a weak relationship between length of residency in Australia and the tendency for immigrants to adopt the predominant suicide methods of the Australian-born, but no association was detected between length of residency and convergence in suicide rates.

As is the case in Australia, the majority of migrant groups in Canada seem to exhibit suicide rates that are closer in level to their countries of origin than to their receiving society. Kliewer and Ward (1988) attempted to ascertain whether migrant suicide propensities converge with those of the Canadian-born. In only 40 percent of the cases (out of a total of 25 immigrant groups) was there indirect evidence of convergence.

Trovato and Jarvis (1986) observed that in Canada, foreigners from predominantly Southern European origins and a Catholic religious culture (such as Italians and Portuguese) tend to share very low odds of suicide, whereas

immigrants that are predominantly Protestant and Anglo-Saxon in origin tend to demonstrate an above average risk of suicide (e.g., American, German and Scottish immigrants).

Whitlock (1971) made a similar discovery in Australia. The British, the Irish and the New Zealanders share a common Anglo-Saxon culture with the Australian-born. They also display higher odds of self-inflicted death than their countries of origin and destination. In contrast, Southern Europeans typically enjoy lower rates of suicide than both origin and destination countries. Whitlock (1971) interpreted these patterns of differences as providing support for the hypothesis that immigrant suicide rates are determined by tradition and social attitude.

Homicide and motor vehicle fatalities are symptomatic of difficulties in adopting to a new land. Information about migrants' pattern of death from these causes is scant. The available evidence suggests that rates of homicide and accidental death are quite high among foreigners in Australia (Burwill et al., 1973), in France (Brahimi, 1980), and in England and Wales (Marmot et al., 1984).

Burwill and colleagues (1973) discovered that migrant rates from motor vehicle accidents are higher than those in the Australian-born in virtually all age groups. Unlike suicide, migrant death rates from traffic accidents tend to be closer to the Australian-born levels than to those

prevailing in their home countries. In general, groups with high suicide rates also share high rates of mortality from motor vehicle accidents and other forms of violence, suggesting that violent and accidental mortality may be a function of some underlying common factor.

The situation in France provides further indication that immigrants tend to die more from violent causes such as homicide and from road accidents in comparison to the receiving population (Brahimi, 1980). An interesting observation is that the more recent immigrant groups tend to show higher rates of road accidents mortality than the more established groups. This finding may indicate adjustment problems for newcomers, such as difficulty in internalizing the rules and norms of the road prevailing in the host nation.

Concerning immigrants' increased odds of homicide mortality, Burwill et al. (1973) proposed that murder is a form of aggression carried over from the migrant's culture of origin -- a view consistent with Wolfgang and Ferracuti's (1967) culture of violence theory which proposes that the tendency for outward aggression is a learned behaviour during one's socialization.

Some criminologists have applied this perspective to explain differences in homicide rates among nations. For example, Gartner (1990) tested a model of crossnational and temporal variations in homicide rates using sex-age victimization data for 1950-1980. At the national level,

homicide victimization rates necessarily reflect a society's tendencies for lethal violence. She found support for the prediction that homicide will be higher where the death penalty is legally sanctioned and where involvement in wars has been more frequent and more deadly.

Gardner's study is based partly on the importance of socialization in explaining violent behaviour and on the modeling-habituation principle -- that the more one is exposed to a particular behaviour (e.g., violence), the more likely are individuals to execute the action themselves (Bandura, 1973). Thus, the culture of violence explanation assumes that differences in homicide reflect "an underlying system of norms prescribing, or failing to prescribe, violence as a response to conflict" (Gartner, 1990:96).

Williams and Flewelling (1989) provided additional support for this thesis. They included indicators of "violent cultural orientation" in their model of criminal homicide in American cities. It was found that cultural orientation is indeed an important predictor of homicide resulting from interpersonal conflicts, even after the effects of resource deprivation and social disorganization variables were held constant.

Why do certain immigrant groups experience greater levels of homicide victimization than others? While there is overwhelming evidence in the United States and Canada that the majority of homicides occur intraracially (Kennedy

and Forde, 1990; O'Brien, 1987), the facts are less certain with regard to immigrant intragroup violence (Nettler, 1982). In Canada there is no empirical information as to whether homicide victimization among immigrants is a predominantly intragroup phenomenon as opposed to an intergroup one. Analysts have reported that approximately 78 percent of all homicide victims in this country share close relational ties with their assailants (Silverman and Kennedy 1987).

While this evidence says nothing about intergroup violence among immigrants, it may be interpreted to suggest that perhaps most immigrant homicides in Canada involve persons of the same migrant group. To the extent that this is a true reflection of reality, a group's observed level of homicide victimization may be taken as a reflection of violent aggression toward other members of the same group. Ideally, information on the country of birth of both assailant and homicide victim would be required to determine the veracity of this assumption. Unfortunately, such data are not available, as they are not included in the death records.[4]

An explanation of variability in homicide victimization rates among immigrants must also consider economic inequality and group differences in community integration (Messner, 1982; Cohen et al., 1981; Williams, 1984; Williams and Flewelling, 1988; Shaw and McKay, 1942; Gartner, 1990; Fiala and LaFree, 1988; Sampson and Groves,

1989). There is a direct association between economic inequality and homicide rates (Gartner, 1990; Messner, 1989; Williams and Flewelling, 1988). The underlying mechanism in this relationship involves economic inequality as a cause of alienation, despair and pent up aggression often resulting in personal conflict and criminal violence (Gartner, 1990). We anticipate that among immigrants the relationship between economic inequality measures and homicide mortality would also be positive.

In accordance with the social integration perspective (Shaw and McKay, 1942), we would expect that homicide mortality rates will be relatively low among immigrant groups that are known to share a high degree of ethnic community integration. Communities that are characterized by strong social network density exert greater levels of control on the activities of its members (Breton, 1967; Reitz, 1980; Pescosolido and Georgianna, 1989) and are better able to assuage conflicts that could lead to murder (Sampson and Groves, 1989).

3. Conceptual Framework

The mortality experience of immigrants in host nations can be understood in terms of four sets of factors: (1) culture of origin effects; (2) factors in the country of destination; (3) personal characteristics and (4) selectivity due to return migration. These components are displayed in Figure 1.

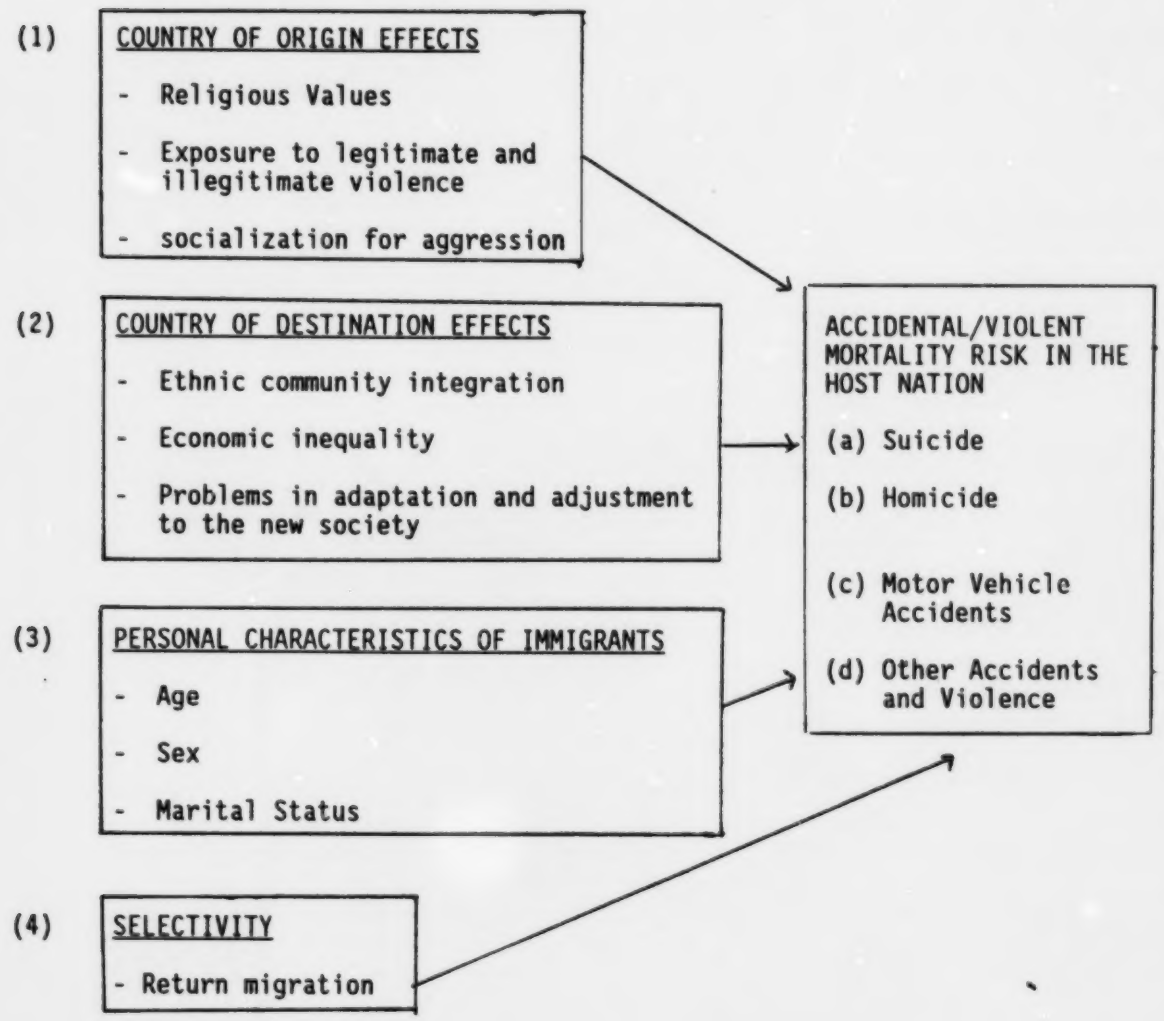

FIGURE 1: Factors Associated with Accidental/Violent Mortality Among Immigrants in Host Nations.

We expect that country of origin would be relevant in explaining suicide and homicide variations among migrants, but not in connection with accidental mortality. It is assumed that differences in accidental mortality are largely a function of situational problems in the immigrants' new environment and are therefore unrelated to one's country of origin (i.e., culture of origin).

It is known that different cultures share particular orientations with regard to suicide and death. According to Aries (1974; 1982; 1985) death is a central aspect of collective identity, reflected in a society's images and representations of it, such as in art, burial rituals and tombs. Psychohistorians have elaborated on this idea. Kushner (1984), for example, has argued that immigrant differentials in suicide reflect variability in national culture pertaining to rituals of bereavement. In societies where exaggerated mourning is an accepted part of the culture, suicide rates are low (e.g., Southern Europe). It is thought that the cathartic effect of expressive mourning alleviates the unconscious tendency for self-punishment when a loved one is lost. Countries that do not generally possess such rituals tend to show increased rates of suicide, presumably due to the individual not having access to an outward expression of guilt when a loved one has died. Insofar as bereavement practices are part of a nation's culture, this argument provides insight concerning

differences in orientation toward the act of suicide among immigrants.

One other important source of a nation's cultural orientation to suicide is its moral judgements embodied in its national religion. Thus, Catholic countries show lower suicide rates than Protestant ones because Catholicism has always viewed suicide as a sin. Individuals socialized in such regions of the World are less likely to commit suicide, even in the presence of extreme psychological distress.

Concerning homicide, we have seen earlier that national culture can be an important factor (Gartner, 1990). Immigrants carry with them elements of their early socialization for conflict management and outward aggression learned in their home land. Therefore, homicide rates of migrants in their host nation would vary depending on their national origin.

The second component of Figure 1 pertains to country of destination effects on immigrant mortality. Migration can often be a very stressful process due to an individual's severing of ties with his homeland and significant others, in most cases permanently. Many immigrants must overcome language barriers and learn the expectations of the new society. This process is usually a continuous one, but it is perhaps more stressful for persons whose culture of origin differs significantly from that of the receiving country. A number of studies provide evidence that is

indicative of immigrants' difficulties in adjusting: foreigners tend to suffer increased rates of psychiatric illness, distress and mental hospital admissions (Kasl and Berkman, 1985; Hull, 1979; Mirowsky and Ross, 1980; King and Locke, 1987; London, 1986; Krupinski, 1967; Odegard, 1932, Berry et al., 1987; Vega, 1987; Locke and Duval, 1964). Often, the stresses associated with the migration experience may culminate in increased odds of suicide, accidental or violent death (Rosenwaike, 1987; 1983; Rosenwaike and Shai, 1989; Shai and Rosenwaike, 1988).

We anticipate that the stresses of the immigration experience are conditioned by a group's level of socioeconomic well-being in the host nation and also its degree of ethnic community integration. Groups that share close informal ties in a cohesive ethnic community will likely suffer fewer cases of stress related mortality (Litwak and Messeri, 1989; Moen et al., 1989; Lin and Ensel, 1989; Pescosolido and Georgianna, 1989). Economic status is inversely related to suicide (Simon, 1968) and homicide (Gartner, 1990; Messner, 1989). Therefore, we expect that measures of economic standing would be inversely related to accidental mortality among immigrants as well.

The third component in Figure 1 pertains to the effects of personal characteristics on mortality. Age, sex and marital status are significantly associated with mortality risk. Accidental or violent death occurs most frequently

to young people who are male and single (Gove, 1973). Therefore, these three variables are important controls in our statistical analysis.

Observed differences in mortality may be a function of selection effects. A number of immigrants return to their homeland; therefore, those who remain in the new country may not be totally representative of all migrants. This situation is particularly critical in the case of mortality differentials. If return migrants consist predominantly of individuals who experience difficulties in coping with the new society, observed differences across groups will be affected accordingly. For example, the observed risk for groups whose most stressed members have returned home would tend to be lower than what it might have been otherwise. Unfortunately, it is impossible to control for the effects of return migration, as it would require information on who leaves the country and on their mortality experience outside Canada. Therefore, this study is necessarily confined to immigrants who have remained in Canada.

4. Hypotheses

From the relevant literature and the framework suggested in Figure 1 we propose the following hypotheses:

H1: Immigrant mortality rates from suicide and homicide will approximate more closely the rates of suicide and homicide prevailing in their countries of origin than those prevailing in their country of destination;

H2: The independent effect of country of origin on immigrant mortality due to suicide or homicide will be positive;

H3: Immigrant accidental mortality rates will approximate more closely the rates of accidental mortality prevailing in the host country than those prevailing in the country of origin;

H4: There will be no country of origin effect on immigrant accidental mortality;

H5: The higher the relative income of immigrants, the lower the death rate from suicide, homicide and accidental death;

H6: Immigrant differentials in suicide, homicide and accidental death rates will persist even after the effects of income, country of origin, and social demographic characteristics have been statistically controlled.

The first and second predictions are based on the premise that if there is a culture of origin effect on immigrant suicide and homicide mortality the differences in rates between immigrants and their respective national origin populations should be relatively small and less than their differences in relation to their adopted country. Thus, in a multivariate analysis, an indicator of the immigrants' national origin culture should be statistically significant.

We do not expect such an outcome in connection with accidental mortality. We argued that accidents are situationally determined and have no relationship to one's national cultural background; they are a reflection of the individual's immediate circumstances in his new environment. Correspondently, hypotheses three and four call for no culture of origin effects, and for migrant accidental mortality rates to be more akin to their country of destination than to their countries of origin.

Hypothesis number five is grounded in the literature concerning the effects of income inequality on suicide and homicide. The relationship between measures of economic position and mortality is known to be generally inverse (Autonovsky, 1967; Kitagawa, 1977; Kitagawa and Hauser, 1973; Duleep, 1989; Simon, 1968; Messner, 1983; Gartner, 1990). We expect this relationship also applies in the case of migrant homicide, suicide and accidental mortality.

The last hypothesis derives in part from the arguments raised earlier concerning the protective influence of a cohesive ethnic community on immigrants' risk of death. Earlier we discussed the criminology literature concerning the expectation that more socially integrated communities tend to experience relatively lower rates of homicide (Shaw and McKay, 1942; Sampson and Groves, 1989; Gartner, 1990). Similarly, we anticipate that suicide and accidental deaths will be less frequent in highly integrated immigrant ethnic communities. The other part of hypothesis number six is based on the selectivity problem identified earlier.

Since we do not possess direct measures for the effects of community integration and return migration selectivity, the independent effect of immigrant group <u>per se</u> in a multivariate analysis would likely reflect these two unmeasured sources of variation. We surmise that the residual variance in the group variable is more likely to be a reflection of ethnic community effects for relatively recent groups in Canada that are culturally dissimilar to

the host country. Such groups share a particular need to develop a highly integrated ethnic community in order to better cope with the contingencies of living in a foreign society. Such individuals share a strong need to maintain close ties with their ethnic community. For them the ethnic community serves as a buffer against the shocks of the migration experience.

On the other hand, for immigrant groups that are similar in origin and culture to the host society, the necessity of an ethnic community is significantly less important, as they are fully cognizant of the language, the culture and other important aspects of the host nation. The migration experience should not be as difficult; and therefore, in a multivariate analysis, a significant effect of group membership for such groups is more likely to reflect return migration selectivity effects rather than ethnic community influences on mortality.

5. Data and Methods

The data for this study were obtained from three different sources for the period 1970-1972. Deaths for immigrants and the Canadian-born were taken from the Mortality Data Base at Statistics Canada. The denominators for the computation of rates (the base populations) were compiled from the 1971 complete census tapes. Appropriate mortality and population data for the migrants' countries of origin were taken from World Health Organization

publications (World Health Organization, 1971, 1972) and from the United Nations Demographic Yearbook (1971, 1972, 1973).[5]

Four specific immigrant groups and their respective countries of origin are studied: the English-Welsh (one group),[6] the Americans, the Scottish, and the Italians. Among these groups, the Italians are the most recent settlers in Canada and represent the most distinct group in terms of cultural origins. They are predominantly of Roman Catholic religious background. This group scores among the highest in degree of institutional completeness; that is, in the extent to which the community has been successful in establishing informal and formal institutions directed specifically to the needs of the group itself (Breton, 1964; Reitz, 1980; Darroch and Marston, 1984). The other three classes of migrants are predominantly of Anglo-Saxon origin and thus not very distinct from the Canadian society. On the basis of such similarity, one may surmise that these groups would not differ significantly from the Canadian-born in mortality risk.

It would have been preferable to include a larger selection of immigrant groups into the analysis. This was not possible for a number of practical reasons. Most importantly, for many prospective groups we found very few deaths recorded due to the rare nature of the events of interest to this study (too many empty cells). Ultimately, it was decided to focus on these four relatively large

groups and to combine all other foreigners in an "Other Foreign-Born" class.

Our data set contains aggregate information on immigrants, their countries of origin, and the Canadian-born; it is a large multiway contingency table of deaths and corresponding population counts crossclassified by cause of death (suicide, ICD-9 codes E950-E959; homicide, ICD-9 codes E960-E969; motor vehicle accidents, ICD-9 codes E810-E825, E929; other accidents and violence, ICD-9 codes E800-E809, E826-E928, E930-E999), age (15-29, 30-39, 40-49, 50-59, 60-69, 70+), sex (male, female), marital status (single, married, other) and immigrant group (Canadian-born, U.S.A., England and Wales, Scotland, Italy, Other Foreign-born, Missing Nationality).[7] This file also includes appropriately crossclassified information on family income of immigrants and the Canadian-born, taken from the 1971 Census. This variable is used as a measure of economic inequality in the multivariate analysis.[8]

6. Operationalization of Hypotheses

The hypotheses delineated earlier are evaluated with the use of methods appropriate for modelling rare events. Since the dependent variables are dichotomies (dead vs. alive) they can be treated as rates and may be analyzed with log-linear methods (Clogg and Eliason, 1988). It is assumed that the underlying sampling model for the risk of dying from suicide, homicide or accidents is Poisson: that

is, the risk of dying from such causes is small and constant, the deaths are distributed independently, and the population exposed to risk is large. The exponential property of the Poisson distribution permits modelling such rare events by making use of the log-link, of which the natural logarithm is its natural parameter (Agresti, 1990; Clogg and Eliason, 1987; Feller, 1968; Laird and Olivier, 1981). Our specification of the cause-specific death rate is:

$$\log(D_{ij}/E_{ij}).C_{ij}) = \lambda + \sum_{j=1}^{k} B_j x_{ij} + \gamma_z + e_{xi} + \sum_{j=1}^{k} \alpha_j (Z \cdot IM)_{ij}$$

where:

D_{ij} = the number of deaths across categories of variables I and J,

E_{ij} = the population at risk across categories of variables I and J,

C_{ij} = $(P_{ij}/ \Sigma P_{ij})$, is a standard weight, where P_{ij} = the age-sex specific population of Canada in 1971, and ΣP_{ij} = the overall sum of the age-sex specific standard population;[9]

λ = the regression constant (baseline hazard),

B_j = the amount by which the death rate changes for a unit change in the jth independent variable (e.g., age, sex, marital status), while other

variables are held constant, subject to the restriction $\Sigma B_j=0$,

X_{ij} = the value of the ith observation for the jth immigrant/nativity group,

γ_Z = the parameter for the effect of relative income on the death rate; $Z = (IM - \bar{X}/SD\bar{x})$, where Z = the standardized relative income score, IM = the average family income of a given immigrant/nativity group, $\bar{X}$ = the overall mean for income, and $SD\bar{x}$ = the standard deviation of $\bar{x}$,

X_i = country of origin effect, where X_i = the age-sex-cause specific death rate for a given immigrant group's country of origin,[10]

$\alpha_j(Z \cdot IM)ij$ = an interaction effect of relative income with immigrant group, where Z = the income measure and IM = immigrant group, subject to the restriction $\Sigma\alpha_j = 0$.

Note that the left side of the equation is the directly age-sex standardized death rate. The right side expresses the rate as a function of log-linear parameters described above.

7. Results

Age-Standardized Rates

Table 1 displays directly standardized death rates for suicide, homicide, motor vehicle accidents and other

accidents and violence. There is considerable variation in mortality risk between groups within Canada and among the four national populations. Among the latter, the United States possesses the highest rates of mortality from each of the four causes of death.

Within Canada, the native-born show the highest odds for homicide, motor vehicle accidents and other accidents and violence, while American immigrants rank highest in suicide propensities. Italian and English-Welsh immigrants tend to share relatively low risks across all four causes of death, whereas the Americans and the Scottish tend to share relatively high odds. The residual class of foreigners demonstrate a heightened risk of homicide in relation to migrants from both the United States and Scotland. Given that this group (Other Foreign-born) represents a very heterogeneous combination of immigrants, it is not possible to provide substantive reasons for its observed pattern of mortality risk.

Table 1 also contains differences in standardized rates between immigrants and the Canadian-born and their respective countries of origin (Columns 3 and 4). With few exceptions (e.g., American and Other Foreign born migrants) immigrants consistently display lower rates of violent and accidental mortality than do the native-born population of Canada. The largest discrepancies are associated with motor vehicle accidents and with other accidents and violence. Persons born in Italy enjoy the largest

advantage over the host population in connection with suicide, motor vehicle fatalities and other accidents-violence. In the case of homicide, it is the English-Welsh that experience the largest advantage over those born in Canada.

The differences between immigrants and their corresponding countries of origin are less uniform than those in relation to their host population. In 8 out of 16 comparisons, immigrants possess higher rates than their corresponding home country. The most consistent groups in this regard are the Italians and the Scottish: The former group exhibiting consistently lower risks from all four causes of death, while the latter consistently shows increased odds in relation to the home nation.

Column (6) in Table 1 gives an indication as to whether the immigrant rates are closer to either those of the receiving society or those of the home based country . Recall that our first hypothesis predicts suicide and homicide rates of immigrants to be more akin to those of the home countries than to those of the Canadian-born. The results in Table 1 are mixed, but generally in favour of our expectation. In three out of four cases for suicide mortality we find confirmation of the prediction (the Italians, the English-Welsh, and the Americans). For homicide, the groups that conform to our hypothesis are the English-Welsh, the Scottish and the Italians.

TABLE 1. Age Standardized Death Rates (per 100,000 population) for Immigrants, Their Countries of Origin and the Canadian Born, and Differences in Rates, 1970-72

Cause of Death and Group***	RATES**		DIFFERENCE IN RATES*			
	(1)	(2)	(3)	(4)	(5)	(6)
Suicide	Immigrants	Country of Origin	I-CB	I-CO	CB-CO	Description of Differences
CB (15.92)						
USA	19.34	16.10	3.42	3.24	-.18	(B)
E-W	11.23	9.49	-4.69	1.74	6.43	(B)
SC	15.04	9.04	-.88	6.00	6.88	(A)
IT	6.23	7.27	-9.69	-1.04	8.65	(B)
OFB	17.62	----	1.70			
Homicide						
CB (2.27)						
USA	1.79	12.73	-.99	-10.94	-9.96	(A)
E-W	0.73	0.81	-2.04	-.08	1.96	(B)
SC	1.87	1.61	-.90	.26	1.16	(B)
IT	0.90	1.22	-1.87	-.32	1.55	(B)
OFB	2.91	----	.14			
Motor Vehicle Accidents						
CB (32.90)						
USA	26.84	33.48	-6.06	-6.64	-.58	(A)
E-W	19.15	16.50	-13.75	2.65	16.40	(B)
SC	27.15	19.18	-5.75	7.97	13.72	(A)
IT	14.28	28.67	-18.62	-14.39	4.23	(B)
OFB	27.92	----	-4.98			
Other Accidents and Violence						
CB (35.43)						
USA	31.76	37.40	-3.67	-5.64	-1.97	(A)
E-W	23.82	22.38	-11.61	1.44	13.05	(B)
SC	32.77	31.13	-2.66	1.64	4.30	(B)
IT	20.20	25.45	-15.23	-5.25	9.98	(B)
OFB	35.40	----	0.03			

NOTES: I = Immigrant group, CB = Canadian-Born, CO = Country of Origin, USA = United States, E-W = England and Wales, SC = Scotland, IT = Italy, OFB = Other Foreign Born
(A) = Immigrant Group's rate is closer to the Canadian-Born than to the country of origin.
(B) = Immigrant Group's rate is closer to the country of origin than to the Canadian-born.
--- = Country of Origin not applicable.

(Table 1 continued)

The rank order correlation coefficients for the four causes of death are as follows:

	(1)	(2)	(3)	(4)
(1) suicide	1	.70	.86	.87
(2) homicide	.94	1	.73	.82
(3) M.V.A.	.97	.96	1	.92
(4) O.A.V.	.98	.96	.99	1

The coefficients above the diagonal are for all ranks including immigrants, the Canadian-born and the countries of origin. The coefficients below the diagonal consider only the ranks of immigrants and the Canadian-born. All coefficients are significant at $p \leq .05$.

* During the period 1970-72, there were 1,197 "Missing" cases that could not be assigned to any particular nationality group. This figure represents 2.98 percent of the total number of deaths (N = 40,116) in this analysis. The rates in this table are based on the "Known" cases for the four causes of death considered here. The number of deaths for these causes are as follows: Suicide (7,566), Homicide (1,232), Motor Vehicle Accidents (14,942), Other Accidents and Violence (16,376). The number "Missing" by cause are: Suicide (169), Homicide (31), Motor Vehicle Accidents (500), Other Acccidents and Violence (497).

** The rates are age-standardized based on the age distribution of the total population of Canada in 1971. The direct method of standardization was used.

*** The ICD-9 codes for the four causes of death are as follows: Suicide (E950-E959), Homicide (E960-E969), Motor Vehicle Accidents (E810-E825, E929), Other Accidents and Violence (E800-E809, E826-E928, E930-E999).

We had also posited that accidental death rates would be closer to the immigrants' country of adoption than to their respective home countries. The American migrants conform to the prediction, as their mortality risks from motor vehicle accidents and other accidents-violence are more akin to the receiving population's rates. Also, the Scottish appear to be closer to the Canadian-born than to their home country in connection with motor vehicle fatalities.

On the whole, the results in Table 1 are not supportive of the view that immigrant rates converge with their adoptive country's mortality levels. The most typical pattern in Table 1 is a considerably lower risk for foreigners on all four causes of death in relation to the host nation. Moreover, insofar as distance in rates from the receiving and origin populations can be taken to suggest country of origin effects, as opposed to country of destination influences on immigrant mortality, the preliminary evidence given in the Table implies that both factors may be important. These results need to be interpreted with caution, however, because the analysis controls only for age composition and it leaves out other important variables such as gender, marital status, discrepancies in socioeconomic status, and direct controls for country of origin effects. We therefore view these results as tentative, and will provide a more conclusive analysis below.

Multivariate Analysis

Table 2 presents log-rate equations[11] for all causes combined and each cause of death separately. The appropriate equations are given in column (1), while in column (2) differences in risk between each immigrant class and the native-born Canadians are displayed.[12] Note that the latter differences exclude the residual migrant class (Other Foreign-Born) and the "missing" category of nativity, as they are of no substantive importance to this part of the analysis (column 2). It is worth noting, however, that these two classes of nationality (variables) had to be included in the statistical analyses (column 1) in order to adjust for the possible confounding influence of "missing" nationality on mortality risk across groups.[13]

Concerning all four causes of death combined, the highest risks are evident for young males (age 15-29) of single marital status. The residual class of nativity (OFB) displays the largest independent risk on the overall death rate (1.0263), while Italians show the lowest odds (-.1938). The effects of country of origin and income are both statistically significant and in the expected direction: the higher the death rate in an immigrant group's country of origin, the higher is the risk of dying in Canada, and the higher the relative income, the lower the death rate. The interaction effects of income with nationality are generally inverse, except for Italians,

whose coefficient is positive (but not statistically significant). In relation to the Canadian-born, the four migrant groups share lower relative risks, with the Italians enjoying the largest advantage (-.8257), and the Scottish the lowest (-.0341); however, only the coefficient for Italians is statistically significant.

Our second hypothesis calls for suicide and homicide propensities of immigrants to be directly linked to their corresponding countries of origin. The evidence provides only partial support for this prediction. This effect is statistically significant in the case of immigrant suicide, but in all other cases (except for all causes combined), country of origin (as operationalized here), is irrelevant in explaining mortality propensities of migrants.

The country of origin parameter on suicide is substantial (1.2632), implying that persons from world areas of relatively high suicide propensities are three and-a-half times more susceptible to commit self-murder in their adopted land (odds = exp 1.2632 = 3.54), than are persons originating from countries with low rates of suicide. Of the four groups in this analysis, the Italians come from a region characterized by low suicide propensities, while the Americans come from a country that possesses a relatively high suicide rate. The English-Welsh and the Scottish are from nations with a moderate suicide level (see Table 1).

Notwithstanding these facts, the independent influence of group membership on suicide is insignificant for American, English-Welsh and Scottish born-immigrants. That is, once age, sex, marital status, country of origin effects, and income discrepancies are taken into account, the observed suicide differentials between each of these groups and the Canadian-born become insignificant. Note that in Table 1 the evidence showed a very different pattern of differences in relation to the Canadian-born.

For Italian migrants the situation is quite different. They exhibit a significant main effect of group membership even after all relevant variables are controlled in the statistical analysis. Their suicide chances are significantly lower than those of the Canadian-born (-.1.1264). Our interpretation for this outcome is cast in terms of this group's high degree of ethnic community integration and its ability to promote its Catholic-ethnic subculture with strong proscriptions towards suicide, and its high density of community network ties that serve to "shelter" individuals from committing suicide during difficult times.

The main effect of income on suicide is negative, as expected. However, in comparison to the Canadian-born, the group-income interaction effects indicate that increases in family income lead to significantly lower suicide chances only for the English-Welsh. It is worth noting that the interaction effects are rather small in magnitude.

TABLE 2. Log-Rate Equations For All Violent and Accidental Deaths Combined, Suicide, Homicide, Motor Vehicle Accidents and All Other Accidents and Violence; Canada, 1970-72

	CAUSE OF DEATH									
	All Violent and Accidental Causes Combined		Suicide		Homicide		Motor Vehicle Accidents		All Other Accidents and Violence	
EFFECTS	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Intercept	-8.6201		-10.3444		-12.7813		-9.8329		-8.9868	
Age: 15-29	.7240		.4535		.8921		1.1861		.4095	
30-39	.3394		.6863		.9274		.4452		.1350	
40-49	.1876		.6774		.6303		.0811		.0853	
50-59	-.1405		.2891		-.0323*		-.2093		-.2018	
60-69	-.5643		-.5175		-.7910		-.5156		-.4848	
Sex: Male	.4173		.5591		.2834		.5389		.2955	
Female (R)										
Marital Status										
Single	.2734		.1914		.2598		.2423		.3478	
Married	-.4923		-.3432		-.5932		-.3482		-.6353	
Other (R)										
Immigrant Group										
USA	.4583	-.1736*	.5849	-.0034*	.4980*	-.2546*	.5233	-.0758*	.4221	-.2070*
E-W	.2888	-.3431*	.5099	-.0785*	.0122*	-.7404	.2451	-.3540*	.2049	-.4242*
SC	.5978	-.0341*	.6810	.0927*	.4593*	-.2933*	.6102	.0111*	.5344	-.0947*
IT	-.1938	-.8257	-.5381	-1.1264	-.1215	-.8741	-.1374	-.7365	-.0143*	-.6434
OFB	1.0263		1.2809		1.2903		.9187		.9821	
CB	.6319		.5883		.7526		.5991		.6291	
Missing (R)	-----		-----		-----		-----		-----	

Table 2 (continued)

EFFECTS	All Violent and Accidental Causes Combined		CAUSE OF DEATH: Suicide		Homicide		Motor Vehicle Accidents		All Other Accidents and Violence	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
ORIGIN	.5228		1.2632		-.9707*		-.0694*		.2640*	
INCOME	-.1863		-.4011		-.7522		-.1361		-.0832*	
Income*Group										
USA	-.0387		-.0239*		-.1702*		-.0008*		-.0639	
E-W	-.1140		-.0719		-.1834		-.0846		-.1583	
SC	-.0781		-.0447*		-.1238*		-.0378*		-.1081	
IT	.0351*		-.0029*		-.2437*		.0138*		.1003	
OFB	-.0169		-.0527		-.0623*		.0032*		-.0296	
Missing	-.0176*		-.0719		.0091*		.0243*		-.0329*	
CB (R)										
MODEL L^2	3590.03		685.57		307.93		1301.95		2355.65	
DF	229		229		229		229		229	
BASELINE L^2	71088.55		14576.01		2897.72		33728.75		26669.68	
DF	251		251		251		251		251	
R^2_A	.95		.95		.90		.96		.91	
FC	.029167		.029167		.029167		.029167		.029167	

Table 2 (continued)

NOTES: Column (2) corresponding to each equation shows the net difference in risk between each specific immigrant group and the Canadian-born. Significance for these contrasts was computed as follows:

$$Z = (B_1 - B_2)/SQRT((S^2(B_1) + S^2(B_2) - 2COV(B_1, B_2)), \text{ where:}$$

B_1 = group parameter, B_2 = standard group parameter (the Canadian born), $S^2(B_1)$ = standard error squared for B_1, $S^2(B_2)$ = standard error squared for B_2, $COV(B_1, B_2)$ = covariance of B_1 and B_2.

The Baseline L^2 is based on the intercept term only, which assumes equiprobable risk across groups.

$R^2_A = 1 - (L^2/L^2\text{Baseline})$.

Origin = the cause-age-sex specific rate of an immigrant group's country of origin. The Canadian-born, the Other Foreign-born and the "Missing" nationality received zeros for this variable. Thus the origin variable is based only on the rates for immigrant groups' origin countries: United States, England-Wales, Scotland and Italy.

Income = $(IM - \bar{x}/SD\bar{x})$, where IM = average family income for a given immigrant/nativity group, $\bar{x}$ = the overall mean family income, and $SD\bar{x}$ = the standard deviation for overall average family income. For this variable, the "Missing" immigrant class first received the weighted average family income of the known age-sex-marital status-immigrant group specific income values and then it was transformed in accordance with the formula above.

FC = flattening constant for zero cells adjustment = (PAR/2)/CELLS, where PAR = number of parameters fitted in the model, 2 is a constant, CELL = the total number of cells in the data table. The customary adjustment in contingency tables with sparse data is to assign a value of .50 to zero cells. This is not suitable in our case, as even a .50 value divided by a small age-sex-marital status exposure could seriously bias upward the mortality rate for that particular cell. This adjustment has the effect of reducing ("flattening") the model L^2 from what it would be otherwise without this adjustment.

* Means parameter failed to reach statistical significance at least at the .05 level of probability (Z test).

Concerning homicide, the pattern of effects with regard to age, sex, marital status, income, and nationality is quite similar to that noted for suicide, with the unexpected exception that the country of origin factor is actually negative, and statistically unimportant. Thus, as far as immigrants from the four countries studied here are concerned, there appears to be no evidence for a culture of violence effect on homicide.

The main effect of income on homicide victimization is inverse. The interaction terms involving this variable with nativity are also negative (except for the "missing" nationality), but only the English-Welsh term is statistically significant. Therefore, discrepancies in income between immigrants and the Canadian-born appear to be of limited relevance in explaining differences in the propensity to die as a result of murder.

The group effects, expressed as differences form the Canadian-born (column 2), indicate that all four groups share a reduced risk of homicide mortality. The largest relative advantage is for the Italians and the English-Welsh, respectively. The parameters for Americans and Scottish are not statistically significant.

As is the case for suicide, this result for the Italians may be explained from the point of view of ethnic community integration minimizing homicide propensities. The result for the English-Welsh migrants is less straightforward -- they are not known to possess a

particularly strong ethnic community in the same vein as do Italians and other Southern European groups in Canada. The English, being a dominant component of Canadian society, have less need to establish a visibly distinct ethnic community. There must be some other factor, or sets of factors, that are of particular relevance to this group.

Earlier, we had hypothesized that selectivity due to return migration may be captured in the net effects of immigrant group membership, especially for groups that are of similar cultural origins as the Canadian society (e.g., Anglo-Saxon). During the early seventies return migration for persons originating from the British Isles was quite prevalent. Not only was Britain one of the leading "sending" nation to Canada, it also dominated in return migration from Canada to the British Isles, most persons being of English-Welsh origin. In general, the larger the migration flow to a given destination, the higher the volume of return migration (Lee, 1966). Italians were also a leading immigrant group during this period, but generally, their likelihood of returning to Italy was minimal as conditions in the home country were not favourable to such a move (e.g., economy was not prosperous), and most Italians came to Canada wiht the intention of becoming permanent settlers. Given these facts, it is likely that for the English-Welsh, the net effect of group membership is indicative of selectivity effects due to return migration.

Concerning accidental death, our fourth and fifth hypotheses predict that there would not be a country of origin effect and that income would be inversely related to mortality, respectively. In both instances the hypotheses are supported. The country of origin variable in connection with motor vehicle accidents and all other accidents-violence is statistically insignificant. The main effect of relative income is inverse and significant. It is important to note, however, that the interaction of income with nationality is largely unimportant in the case of motor vehicle accidental mortality (except for English-Welsh). Interaction effects in relation to other accidents and violence are statistically significant for all migrant groups and are in the expected direction.

The main effects of immigrant group membership per se for these causes of death (shown in column 2) are generally similar to those observed earlier for suicide and homicide: Only the Italians possess significantly lower risks than the Canadian-born. The remaining group differences are not statistically significant.

7. Conclusions

In this analysis we examined the role of several factors in explaining differentials in violent and accidental mortality among four large migrant groups in Canada. It was found that the risk of dying from suicide is conditioned by personal factors such as one's age, sex

and marital status, income discrepancies and country of origin. For Italians in Canada we found indirect evidence for an effect of community integration. They demonstrated a significant main effect of group membership once all other variables are statistically controlled. In the case of homicide these same predictors are important, but country of origin is insignificant. For the Italians and the English-Welsh group membership is a significant predictor of homicide. In accordance with the arguments introduced earlier, we reasoned that this outcome probably reflects the importance of their ethnic community as a source of social integration for Italians, and a reflection of selection effects due to return migration for the English-Welsh. These sources of variation do not appear to be of relevance for American and Scottish immigrants. In the case of motor vehicle fatalities and other accidents-violence, we found that in addition to age, sex and marital status, the effects of income discrepancies are significant predictors of mortality differentials, while country of origin effects are of no substantive importance.

In the case of suicide, the results are consistent with the culture of origin explanation. For homicide, we had expected that, in accordance with the culture of violence theory in criminology, country of origin would be an important determinant of homicide differentials among foreigners. We found no support for this proposition. Of course, further work is needed to verify the possible

relevance of the culture of violence theory in connection with immigrant homicide. Better measures of a nation's orientation toward aggression and violence are necessary to ascertain with greater certainty how this influence is transmitted to its departing members in search of alternative lands.

It was argued that motor vehicle fatalities and other forms of accidents and violence, to a lesser degree, would have no relationship to factors associated with one's culture of origin. We reasoned that these causes of death are largely governed by situational factors in the host country. The evidence is in agreement with this notion.

Beyond age, sex and marital status, the strongest effects on immigrant mortality rates in Canada are associated with immigrant group membership per se. This variable captures residual variation not accounted by the other variables included in the multivariate analysis. We proposed that the net effect of this variable in part reflects group differences in ethnic community integration and selectivity due to return migration. Only Italians and English-Welsh immigrants displayed net group effects. The former in connection with all four causes of death, the latter only in connection with homicide. The consistency of results for Italians suggests that there may be, indeed, a powerful influence of community integration serving to minimize the risk of violent and accidental death for its

members. Direct tests of these factors are needed in future work.

The findings from this investigation do not conform totally with migrant studies in other parts of the world. For example, foreigners in Australia and in France tend to die more from violence and accidents than their respective receiving populations. In Canada, migrant rates are either consistently below those of the Canadian-born (e.g., Table 1), or are not significantly different from the host population (as shown by the multivariate analysis in Table 2).

Previous studies have not been concerned with theory development in this area. This study has explicitly attempted to relate data to theory. Most studies have failed to examine how aspects of the migration experience actually relate to immigrant mortality (Kasl and Berkman, 1985). We have made an attempt to explore how economic position, as an indicator of one key dimension of conditions in the host nation, influence violent and accidental mortality of foreigners in their adopted land. We also included explicit measure of country of origin affects in a multivariate analysis. In previous studies, this factor is often thought to be an important source of variation, but it has seldom been measured directly. We have seen that this variable is only relevant in the case of suicide.[14] Thus, the inferences drawn here are more conclusive than those found in previous studies, based on

few predictor variables, and typically analyzed with less powerful statistical models.[15]

It is important to recognize a number of limitations with this study that are largely beyond our control. First, it would be desirable to control for length of residency in order to assess whether there is convergence in mortality risk with the host population over time. Since this variable is not coded on death certificates, it was impossible to include it in the analysis. Secondly, an important limitation is the lack of data on the assailant's nationality in connection with homicide. Such information would help to specify a better test of the culture of violence theory; that is, to determine the extent to which homicide is an intragroup phenomenon among immigrant groups.

A possible improvement to this study would be the inclusion of more immigrant groups in the analysis. However, death from accidents or violence is statistically a rare event, and in most cases, the more exhaustive the number of groups, the more likely the presence of sparse data, and results would be less reliable. Also, with a large number of groups the analysis necessarily becomes more complex and could pose problems of interpretation.

There may be a problem of selectivity effects in this study. Some immigrants return to their home land after they have settled in Canada for a number of years. We have no way of checking for the possible confounding influence

of this fact on differences in mortality unless one is able to trace return migrants and monitor their death rates. This task is virtually impossible to undertake. To the extent that foreigner who leave Canada experience the most stress and difficulties in coping, our observations are likely to be underestimates of the extent to which immigrant groups actually differ in stress and conflict related mortality.

FOOTNOTES

1. These external causes of death are mostly a function extreme distress (e.g., suicide) and conflict (e.g., homicide) in one's life. Accidents leading to death may be also linked to stress in life. Persons who experience significant troubles in their lives may unconsciously expose themselves to a greater risk of accidents, such as on the job, or while driving a motor vehicle. From the point of view of this study the proximate causes of accidental and violent deaths among immigrants are unambiguously a function of conditions that prevail in the new environment of action as opposed to situations that may have prevailed in one's home country. For example, in the case of cancer, it is not certain whether a migrant's death in the host country is totally attributable to one's exposure to conditions in the new society; the cancer could have resulted as a function of early exposure to carcinogenic agents while the individual was a resident of his/her home land. Thus, by focusing on external causes of death we avoid this thorny issue of separating origin vs. destination proximate conditions in the etiology of risk. In this connection, it is important to distinguish between "conditions" in the country of origin (such as exposure to carcinogenic agents) as opposed to the possible influence of one's culture of origin as a background factor that may predispose present behaviour in the host nation. The latter, as a significant component of socialization, may be an important factor in predisposing immigrant behaviour in the new society.

2. Migrant mortality studies have been executed mostly in the discipline of epidemiology and demography. Sociology has paid limited attention to this area of investigation. Most often, sociologists examine mortality differentials as a predictor variable or as an index of discrepancies in life chances on the assumption that the higher the rate of mortality, the lower the well-being of the group (c.f., Tumin 1967; Simpson and Yinger, 1985). For a recent review of migrant mortality studies in epidemiology see Kasl and Berkman (1985).

3. Although Durkheim's study dealt with suicide, it is reasonable to assume that in the case of violent and accidental death, the same principles that govern suicide risk apply. That is, the greater one's degree of integration to his/her social group, the lower the risk of death from accidents or violence. As an example we may cite the empirical evidence concerning the likelihood of death from suicide, homicide and motor vehicle fatalities being significantly lower for the married than the non-married. In all three cases,

the married state seems to provide the individual with greater "protection" against risk than is the case with those who are not in a marital union. The regularity and pervasiveness of this fact lends strong credence to the social integration proposition (see Gove, 1973; Kobrin and Hendershot, 1977; House et al., 1988; Maulitz, 1989; Mirowsky and Ross 1989 for further comment and evidence on this topic).

4. Official homicide statistics in Canada do not record country of birth of both the victim and the assailant. Therefore, it is impossible to give a direct answer to the question concerning the nationality of murderer and victim (see Kennedy et al., 1989 for further comment on this).

5. The death rates for the national populations are based on 1971 data only, whereas rates for immigrants and the Canadian-born are three-year averages centred on 1971. Data for the origin countries appear in 1971, 1972 and 1973 publications, but they all correspond to the 1971 period. Note that for the "Other Foreign-Born" class and for the Canadian-Born, mortality data on country of origin would be irrelevant and also impossible to ascertain.

6. Information in World Health Organization reports for this group is consistently published as "England and Wales."

7. During the period under observation there were 40,116 deaths due to suicide, homicide, motor vehicle accidents, and other accidents-violence. Out of this total, 1,197 (2.98%) were classified as "missing nationality" because the death records do not contain country of birth of decendents.

8. The income variable is average family income broken down by nationality, age, sex and marital status, taken from the 100 percent individual file from the 1971 Canadian census. Note that this information is not available for the national populations of origin corresponding to the immigrants in this study.

    Also, it is important to recognize the ecological nature of this measure and of the study itself. Although the data were taken originally from individual vital statistics and census records, they are treaded in an aggregate fashion; that is, the unit of analysis is the age-sex-marital status specific grouping for each immigrant class. Due to the restrictiveness of available information on the death records, this is as refined a crossclassification that can be actualized. The level of aggregation cannot be reduced any lower.

In connection with the income measure, we must make the assumption that income reported in the census by age, sex and marital status for each group is the same as the income for those who are decedent within each immigrant class. We must assume a one-to-one correspondence between the reported income of the alive population and the unknown income of the decedent population. This is not a strong assumption because it is well known that there is an income (social class) gradient (inverse) in mortality, hence persons who are deceased may have had radically different incomes than those who are alive at the time of the census. Nevertheless, since our main interest is in explaining between group differentials in mortality, our procedure is able to capture group discrepancies in income. That is, we assume that the imputed incomes of decedents vary between groups in exactly the same way as it varies in the alive populations across immigrant classess.

9. The choice of standard population is often arbitrary. What is important to realize is that in relative terms it is inconsequential which population one uses as the standard to remove differences in age composition because in a relative sense, differences in death rates will always be the same irrespective of the standard used, though the absolute levels (in death rates) may vary with the use of different standard populations (Hill, 1977).

10. The country of origin effect is operationalized by taking the age-sex specific death rates by cause for each national population and using this variable as a predictor of rates among the corresponding immigrant groups of each national origin. The assumption of this procedure is that mortality risk in the home country is governed in part by socialization for intropunitive aggression (e.g., suicide) and outward violent aggression (e.g., murder). Therefore, the death rates of persons in the home country of immigrants are assumed to reflect elements of their national culture of origin.

11. The log-rate analysis was executed using the LOGLINEAR subroutine in SPSSx.

12. In this part of the analysis we express differences in risk from the Canadian-born. In effect, then, the Canadian-born serves as a standard.

13. The cases with "missing" nationality had to be included in the multivariate analysis, as well as the "Other Foreign Born", in order to control for the potential confounding influence of "missing" country of birth on the risk of death across immigrant groups. "Missing"

was treated as an additional category of nationality for this purpose. The exposures for this class were approximated by taking the difference between the "known" population and the "known" deaths. That is, $Pij^* = \sum(Pij - Dij)$ where: Pij^* = estimated exposures for missing deaths by age, sex, marital status and nationality; Pij = known population counts by age, sex, marital status and nationality; Dij = known deaths by age, sex, marital status and nationality.

Using this approximation as the denominator for the "missing" category of nationality will necessarily lead to relatively low mortality rates for this group. This fact does not pose a problem since the aim is to explicitly take into account the possible counfounding effects of "missing" cases on the "known" group specific death rates. By including this information into the multivariate analysis we are able to control for its confounding effects on the death rate. Note that this approach is more satisfactory than other commonly used methods in similar situations. For example, apportioning the missing cases on the basis of the known distribution of deaths assumes the distribution of missing cases is the same as the known cases, which is an untenable assumption.

14. In an earlier study, Trovato and Jarvis found no statistical support for a country of origin effect on immigrant suicide. The regression coefficient for this factor was negative and insignificant. In this study we find a significant positive effect of this factor. A number of reasons for this difference in resutls come to mind. First, this analysis is based on only four groups, while the Trovato and Jarvis study is based on eight immigrant groups. Secondly, the country of origin effect in the present study is a more refined operationalization than that employed in the earlier investigation. Trovato and Jarvis included the aggregate overall suicide rates of the countries of origin corresponding to the immigrant groups in Canada as an index of country of origin effects. In the present study, we employ age-sex specific rates of the home countries as the index for this factor.

15. Many analyses in this area of study are devoid of theory. Moreover, inferences about cause and effect are usually based on elementary kinds of statistical analyses with few predictor variables, most typically age and sex only.

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